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Mr. Michael Leao, Supervisor
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California Integrated Waste Management Board
1001 I Street
Sacramento, CA 95814

Dear Mr. Leao:

Please accept my apologies for my delay in the delivery of ITW's comments to the December 17, 2004 Draft Report to the Legislature concerning plastic film and trash bags.

At the outset, we must reiterate our concerns with both the tone and substance of the report with regard to non-bag film applications. On the one hand, trash bags are already regulated by statute and the Board needs to address the efficacy of the several statutes in affecting their intended objectives. And, as evidenced by the constructive comments of the participants during the Board-hosted conference call on December 16th, the non-bag film market, and the challenges it poses to a successful diversion program, is equally, if not more complicated than those identified therein. However, the Report repeatedly intermingles these different types of products and implies easily identifiable and implementable solutions. For example, the Report provides the reader with Appendix A as a reference for diversion; but it is limited only to trash bags. The Report does not supply similar statistics on non- trash bag or other film products.

The technology affecting film product production, application and performance is incredible. For example, why is some film blown and yet others cast? Why are barrier layers integrated into some products and not into others? Why stretch film and not shrink film? Food contact v. non-food contact; and what are the attendant regulations both in the US and abroad, where such product is exported? The Report makes no effort to help the reader understand why film is not film. Increasingly, the performance of film products is enhanced by additives that make them slippery or create adhesion, etc. While performance as a primary product is enhanced, these additives can contaminate efforts to recycle these materials into a useful second or third generation product.

With so many of these questions outstanding, we feel the Board is doing a disservice to itself, the Legislature and industry. We are not however suggesting that these and other questions be answered completely before the referenced document is finalized; but we urge you to identify them for the Legislature and build into it the expectation that they will need to be resolved before any Memoranda of Understanding can be negotiated or drafted.

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Also, missing from this report is a discussion of the impact on the consumer if producers of certain film types chose to no longer sell their products in California. Producers of products that are not channeled into the consumer marketplace don't necessarily view the California marketplace through the same eyes as a consumer products company/ distributor. For example, look to our ongoing discussions over the inability of ITW Dymon to comply entirely with the requirements of the RPPC. While not an easy decision, management did decide to label a subset of its products, Not for Sale in California. Such action on the part of a product manufacturer affects not only the sales of the producer but also the operations of the commercial or industrial consumer. Further, while US producers of regulated film products may choose to not sell into California, offshore producers, who are likely to be more difficult to regulate, will fill the gap.

Finally, we must raise the misleading treatment the Report gives to the issue of biodegradability. California, in many areas, deservedly claims credit for its leadership in public policy. However, its treatment and promotion of biodegradability as a panacea for the challenges attendant to waste management is again a disservice to the Legislature and the public.

Following the conclusion of the escapades of the barge Mobro, the American public, for a short time, responded to calls for innovative approaches to waste management, including the purchase of products marketed with a "poof" factor. Soon thereafter, however, the FTC had stepped in to create its Green Labeling Guides, which California adopted, but since allowed to sunset.

To quote Yogi Berra, "Its déjà vu all over again."

The Report is replete with references to the implied benefits of biodegradable films (pp. 4, 9, 11 & 20).

One clear and disturbing error is found in page 11, the ASTM D-6400 does not determine whether plastic material is, in fact, biodegradable. ASTM D-6400 creates a method for determining the compostability of bags. Even then D-6400 contains no requirements for in-situ testing. In fact, the success of D-6400 hinges on the performance of D-5338: A standard test method to determine the aerobic biodegradation of plastic material under controlled composting conditions under laboratory conditions.

Also, as a matter of policy, I looked back at the Board's history with its regulation of the Hi-Cone carrier[Health and Safety Code Section 24384.5] and found an October 28, 1993 Board Notice whereby the Board "determined that a rate of degradation of 120 days will meet the [unspecified] requirements of the Code." If the Board intends to promote biodegradability as a mechanism for waste reduction and management, it seems prudent that the Board should also specify its expectations which material providers will have to meet. Without such expectations and the mechanism for review, the policy is, in our opinion, flawed.

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By 1968, ITW had created, with no statutory requirements or market promises, a proven photodegradable low density polyethylene version of its Hi-Cone carrier. The E/CO carrier, a.k.a. six pack ring, was the benchmark used when the ASTM subcommittee D20-96 was formed and in which test methods for determining the photo-degradability of plastics were approved by consensus as a legitimate test standard. Why did the Committee choose to use the carrier as its benchmark? Because ITW had subjected its product repeatedly to laboratory and in-situ outdoor weathering tests that were reproducible by others. In our Attachment 1, you will please note the number of different resins, additives and compounds submitted to Hi-Cone for use as a feedstock for its carrier. In every case, the material either could not perform as the package was expected by our customers or degrade as expected by regulators.

ITW does not object to the use of *proven* technology in the manufacture of *compost* bags. Indeed, such bags would supply a long sought after market and regulatory expectation. However, over the last twelve years, we have seen little if any reproducible *in-situ* data that proves such a product exists that meets the expectations of compost facility operators, let alone those of landfill operators. The latter proves particularly vexing since proper landfill management creates anaerobic conditions within days of material being posited in a landfill. Also, there is NO discussion of the impact degradable, even proven degradable, products will have on the recycling industry.

We will continue to work with your staff in an effort to develop mechanisms by which the State of California can meet its diversion requirements and expectations. However, we find the referenced Report lacking for any who want to use it to develop such mechanisms for non-bag film products.

Respectfully,

Michael J. Lynch

PHOTO-DEGRADABLE SIX-PACK RINGS

During the late-60's, as the debate over the consequences of litter began to heat up, ITW Hi-Cone decided to develop a degradable version of its plastic can carrier. This carrier would have to hold the cans securely for at least 2-3 days while exposed to sunlight (outdoor displays and distribution) but would degrade if disposed as litter in the natural environment.

At the time, Hi-Cone investigated many available resins and materials including metallic compound additives, and other additives based on polymers such as propylene and butylenes. Unfortunately, these systems were either ineffective, changed physical properties of the package too drastically, imparted odors and colors which were unacceptable to our customers or the actual rate of degradation could not be predicted or controlled. Ultimately, Hi-Cone found and modified the ethylene carbonyl (E/CO)photodegradable resin to meet its needs and requirements.

A successful Hi-Cone carrier material must possess a number of physical attributes, only one of which is degradability. To evaluate any new material technology, ITW Hi-Cone must determine whether the material meets basic requirements before research and development resources are expended. These basic requirements are:

- Clarity (the color must not detract from or cover can graphics or required messages);
- Processable by common extrusion equipment;
- Possess physical properties similar to those found in low density polyethylene type materials (e.g., elongation, recovery, etc.);
- Able to withstand multiple reprocessing(in-line scrap recycling);
- Maintain a minimum shelf stability of at least one year after being processed;
- Able to withstand moisture associated with canning/bottling plants and refrigeration;
- Able to be recycled closed loop and/or with other polyethylene products without affecting product stability;
- Capable of breaking down under various outdoor conditions as litter in a reasonable length of time and in accordance with all applicable state and federal laws;
- Product of degradability is determined to be non-toxic in accordance with all applicable state and federal regulatory requirements;

Many of the laws mandating the degradability of connecting devices apply to plastic and other materials. Clearly, compliance with these and federal and international laws and directives are important to Hi-Cone. Since the federal law enacted in 1988 does not supersede the twenty-seven state laws, a potential material supplier must demonstrate their material's ability to comply with all these laws and directives. A summary of the divergent laws is supplied below.

Definition of “Degradable” by State

Alaska	<u>Section 46.06.150</u> “degradable” means a characteristic of a material that allows the material to be broken down by biological, chemical, photochemical, or other physical processes. (within two years of exposure to natural elements)
California	<u>Section 24384.5(b)</u> “Degradable” means all of the following: (1) Degradation by a biologic process, photodegradation, chemodegradation, or degradation by other natural degrading processes; (2) Degradation at a rate which is equal to, or greater than, the degradation by a process specified in paragraph (1) of other commercially available plastic devices [and] (3) Degradation which, as determined by the board, will not produce or result in a residue or byproduct which, during or after such process of degrading, would be hazardous or extremely hazardous waste identified pursuant to Chapter 6.5 (commencing with Section 25100) of Division 20.
Connecticut	No definition
Delaware	<u>Title 7 Chapter 60 Section 6052(c)</u> “Biodegradable or photodegradable material” means material which is capable of being broken down by bacteria or light.
Florida	<u>Section 403.708.4(a)</u> “Degradable” with respect to any material means that such material, after being discarded, is capable of decomposing to components other than heavy metals or other toxic substances, after exposure to bacteria, light, or outdoor elements. (within 120 days after exposure)
Hawaii	<u>Chapter 339</u> “Degradable” means all of the following: <ol style="list-style-type: none">(1) Capable of achieving degradation by biological processes, photodegradation, chemodegradation, or degradation by other natural degrading processes;(2) Degradation at a rate that is equal to, or greater than, the degradation by a process specified in paragraph (1) of other commercially available plastic devices; and(3) Degradation which will not produce or result in a residue or byproduct which, during or after such process of degrading, would be a hazardous or extremely hazardous waste as specified in the Resource Conservation and Recovery Act.
Iowa	<u>Section 455B.30 1.16</u> “Degradable” means capable of decomposing by biodegradation, photo degradation, or chemical process into harmless component parts after exposure to natural elements (within 365 days)
Louisiana	No Definition (but time requirement of 120 days or less)
Maine	No Definition
Mass	<u>Supplemental 301. CMR 4.02</u> Photodegradable: will decompose or otherwise break down into components which are not hazardous materials within the meaning of M.G.L. c.21E., s.2. These components may include only carbon dioxide, water, inorganic salts, microbial cellular components, miscellaneous by-products characteristically formed from natural materials, or other materials or substances determined by the Secretary to be environmentally benign. These components may not

under any circumstances, include “hazardous materials” as defined in M.O.L. c. 21E, s.2. with requirement to reach 20% elongation within 60 days of exposure)

Michigan	<u>Chapter B. 445.571</u> “degradable” means capable of being broken down by biodegradation, photo-degradation, or chemical degradation into component parts [within 360 days]
Minnesota	No definition
Missouri	<u>S.34.031</u> “decomposes by photo degradation, chemical degradation or biodegradation with a reasonable period of time upon exposure to the elements.”
Nebraska	<u>LB 325 of 1989</u> Degradable shall mean capable of decomposing or deteriorating through a natural chemical process into harmless components after exposure to natural elements... Sec. 5; Photodegradable shall mean degradable through a process in which ultraviolet radiation in sunlight causes a chemical change in a material.
New Hampshire	<u>H.B. 611 FN of 1991</u> Degradable means any material which, when discarded, will decompose [within six months] to components other than heavy metals or other toxic substances, after exposure to bacteria, light or other outdoor elements.
New Jersey	No Definition
New York	No Definition
N. Carolina	<u>Art 52 Chapter 14, Section 14-399.2</u> “Degradable” means that within one year after discarded, the yoke or ring type holding device is capable of becoming embrittled and/or decomposing by photo degradation, biodegradation, or chemo-degradation under average seasonal conditions into components other than heavy metals or other toxic substances as prescribed by RCRA.”
N. Dakota	<u>House Bill 1262 of 1989</u> “Degradable” means capable of being reduced to environmentally benign subunits under the action of normal environmental forces, including biodegradation, photodegradation, chemical degradation, or hydrolysis within reasonable time lines specific for waste types and waste management methods.
Oregon	No Definition (but with time requirement of 120 days]
Penn	<u>Chapter 1 Section 103.</u> Plastic beverage carriers that degrade by biological processes, photo degradation, chemodegradation or degradation by other natural processes. The degradation process does not produce or result in a residue or by-product considered to be hazardous waste.
Rhode Island	<u>Title .23 Custer 38-l(b)</u> Degradable material means material that, upon exposure to natural elements, is broken down by biological, chemical, photochemical or other physical processes to a particle size and chemical composition that may be assimilated harmlessly and aesthetically into the environment without leaving a hazardous residue or by-product.
S. Carolina	<u>Act 63, Laws of 1991</u> Degradable with respect to any material, means that the material after being discarded is capable of decomposing to components other than heavy metals or other toxic substances after exposure to bacteria, light or the outdoor elements.
S. Dakota	<u>Section 34A-7 -1 (9)</u> “Degradable” capable of decomposing by biodegradation, photodegradation or chemical process into harmless component parts after exposure to natural elements for not more than three hundred sixty-five days;

Vermont	No Definition
Virginia	<u>Section 10.1-1415.2</u> “Degradable means decomposition by photo degradation or biodegradation within a reasonable period of time upon exposure of natural elements. “
Wisconsin	<u>Section 134.77(3)</u> [must] decompose by photodegradation or biodegradation within a reasonable period of time after exposure to weather elements.

RESEARCH AND TESTING

In addition, we have subjected the E/CO resin currently used in production to an ongoing battery of tests. These include:

Rosner-Nixon	Bio-assay	1972
U. of Maine(Orono)	Outdoor Weathering	1980
Claremont College(CA)	Outdoor Weathering	1983
U. of Connecticut	Outdoor Weathering	1983
Oregon State U.	Outdoor Weathering	1986
N.O.A.A.	Outdoor Weathering (Marine)	1987
U.S. Marine Mammal Comm.	Outdoor Weathering	1988
Allied Laboratories	E.P. Toxicity	1988
Pack Forsk (Sweden)	Outdoor Weathering	1989
Battelle Institute	Outdoor Weathering (Marine)	1990
University of Maine	Outdoor Weathering	1990
Allied Laboratories	TCLP	1991
Midetates Associates	Bio-assay	1991
Tidy Britain (U.K.)	Outdoor Weathering (Marine)	1992
(Australian) Center for Adv. Materials Tech.	Outdoor Weathering (Marine)	1991

Copies of the above reports are available upon request.

Since the introduction of the photodegradable carrier, ITW Hi-Cone alone or with the assistance of the ITW Technology Center has reviewed and tested materials from many potential suppliers including those listed below. For Hi-Cone, this is an ongoing process.

RESIN MANUFACTURER	TYPE	YEAR EVALUATED
Dow Chemical Co.	Metallic salt additive	1975
union Carbide Corp.	Metallic salt additive	1977/78
Union Carbide Corp.	Polycaprolactone	1978
Wilson Products	Photo-thermal additive	1978
BXL	Metallic salt additive	1984
Shell Oil Co.	Polybutylene	1985
CDF	Metallic salt additive	1985
Princeton Polymer Lab	Photo-thermal additive	1986
Ideamaster	Photodegradable	1987
Ampacet	Ferric stearate-based concentrate	1987
Polysar	Photodegradable	1988
ECOST AR	Starch	1988
EXXON	Photodegradable	1988
ICI Biopol Polymers	PRBV	1988
Agritech	Starch concentrate	1988
U.S. Dep't of Ag	Various starch resins	1988
Ecolyte	Ketone bio-photo additive	1988/89
Archer. Daniel Midland	Starch/prodegradant additive	1988/89
Belland	Water soluble resin	1989
Rhone-Poulenc	Metallic salt additive	1989
Polycom-Huntsman	Metallic salt additive	1989/90
Polycom Huntsman	Photodegradable	1990

Wamer-Lambert/Novon	Starch based polymer	1990	
ECOSTAR	Starch	1989/90	
Novamont, N.A.	Bio starch	1990	
Union Carbide	Polycaprolactone	1990	
NOVON	Bio starch	1992	
Florida Caribbean Mfg.	Water Soluble/Biodegradable	1992	
Novamont, N.A.	bio starch	1993	
Environmental Products	Metallic Salt additive	1993/94	
Enviroplastic	Polyester based compostable	1993/94	
ECOSTAR	Prodegradant additive	1994	
Environmental Products Inc	Metallic Salt Additive	Reevaluated in 1995/1996	Willow
Ridge Plastic, Inc	UV-H Photodegradable Additive	1996/1997	
DuPont	Biomax/PET	1997	
Symphony Environmental	Tuffy Metallic Salt Additive	1998	
Dow/Cargill	Polylactic Acid	1998	
Plastics Solutions (TDPA)	Metallic Salt Additive	2000	

POST-CONSUMER USES

Finally, the resin cannot contaminate a LDPE recycling stream. In the mid-1990s, Hi-Cone undertook the effort to determine if post consumer carriers could be used as a component in a closed loop recycling program. After much testing, we came to the conclusion that even fully degraded E/CO carriers could be incorporated as feedstock in the production of new carriers. ITW Hi-Cone created mechanism through which it would buy back post consumer carriers; but the quantity was too long to support the venture. Instead, Hi-Cone created the web site, www.ringleader.com which has been designed as a teaching aid for teachers around the world. Carriers collected through the site are ultimately transferred to one of two ITW Angleboard facilities where its is commingled with other LDPE and extruded into commercial packaging. Replacement resins CANNOT contaminate this stream.